



SEQUENCE LISTING

<110> TANAKA, YOSHIKAZU
ONO, EIICHIRO
NAKAMURA, NORIKO
MIZUTANI, MASAKO

<120> METHOD FOR PRODUCING YELLOW FLOWER BY CONTROLLING
FLAVONOID SYNTHETIC PATHWAY

<130> 47237.5008/00US

<140> 10/583,110

<141> 2006-06-15

<150> PCT/JP2004/019461

<151> 2004-12-17

<150> JP 2003-420046

<151> 2003-12-17

<160> 70

<170> PatentIn Ver. 3.3

<210> 1

<211> 1422

<212> DNA

<213> Artificial Sequence

<220>

<221> CDS

<222> (1)..(1371)

<220>

<223> Description of Artificial Sequence: Synthetic
nucleotide construct

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1 5 10 15
gaa gaa cac ctc aac tct tca ata gcc ctt gca aag ttc ata acc aaa 96
Glu Glu His Leu Asn Ser Ser Ile Ala Leu Ala Lys Phe Ile Thr Lys
20 25 30
cac cac tct tca atc tcc atc act atc atc agc act gcc ccc gcc gaa 144
His His Ser Ser Ile Ser Ile Thr Ile Ile Ser Thr Ala Pro Ala Glu
35 40 45
tct tct gaa gtg gcc aaa att att aat aat ccg tca ata act tac cgc 192
Ser Ser Glu Val Ala Lys Ile Ile Asn Asn Pro Ser Ile Thr Tyr Arg
50 55 60
ggc etc acc gcg gta gcg ctc cct gaa aat ctc acc agt aac att aat 240
Gly Leu Thr Ala Val Ala Leu Pro Glu Asn Leu Thr Ser Asn Ile Asn
65 70 75 80

aaa aac ccc gtc gaa ctt ttc ttc gaa atc cct cgt cta caa aac gcc	288
Lys Asn Pro Val Glu Leu Phe Phe Glu Ile Pro Arg Leu Gln Asn Ala	
85 90 95	
aac ctt cga gag gct tta cta gat att tcg cga aaa tcc gat atc aaa	336
Asn Leu Arg Glu Ala Leu Leu Asp Ile Ser Arg Lys Ser Asp Ile Lys	
100 105 110	
gca tta atc atc gat ttc ttc tgc aat gcg gca ttt gaa gta tcc acc	384
Ala Leu Ile Ile Asp Phe Phe Cys Asn Ala Ala Phe Glu Val Ser Thr	
115 120 125	
agc atg aac ata ccc act tac ttc gac gtc agt ggc ggc gct ttt etc	432
Ser Met Asn Ile Pro Thr Tyr Phe Asp Val Ser Gly Gly Ala Phe Leu	
130 135 140	
ctc tgc acg ttt ctc cac cac ccg aca cta cac caa act gtt cgt gga	480
Leu Cys Thr Phe Leu His His Pro Thr Leu His Gln Thr Val Arg Gly	
145 150 155 160	
gac att gcg gat ttg aac gat tct gtt gag atg ccc ggg ttc cca ttg	528
Asp Ile Ala Asp Leu Asn Asp Ser Val Glu Met Pro Gly Phe Pro Leu	
165 170 175	
att cac tcc tct gat tta cca atg agt ttg ttt tat cgt aag act aat	576
Ile His Ser Ser Asp Leu Pro Met Ser Leu Phe Tyr Arg Lys Thr Asn	
180 185 190	
gtt tac aaa cac ttt cta gac act tcc tta aac atg cgc aaa tcg agt	624
Val Tyr Lys His Phe Leu Asp Thr Ser Leu Asn Met Arg Lys Ser Ser	
195 200 205	
ggg ata ctc gtg aac acg ttt gtt gcg ctc gag ttt cga gct aag gaa	672
Gly Ile Leu Val Asn Thr Phe Val Ala Leu Glu Phe Arg Ala Lys Glu	
210 215 220	
gct ttg tcc aac ggt ttg tac ggt cca act ccg cct ctt tat tta ctt	720
Ala Leu Ser Asn Gly Leu Tyr Gly Pro Thr Pro Pro Leu Tyr Leu Leu	
225 230 235 240	
tca cat aca att gcc gaa ccc cac gac act aaa gtg ttg gta aac caa	768
Ser His Thr Ile Ala Glu Pro His Asp Thr Lys Val Leu Val Asn Gln	
245 250 255	
cac gaa tgc cta tca tgg ctt gat ttg cag cct agt aaa agc gtg att	816
His Glu Cys Leu Ser Trp Leu Asp Leu Gln Pro Ser Lys Ser Val Ile	
260 265 270	
ttc ctt tgt ttc gga aga aga gga gcg ttc tca gca caa cag ttg aaa	864
Phe Leu Cys Phe Gly Arg Arg Gly Ala Phe Ser Ala Gln Gln Leu Lys	
275 280 285	
gaa att gcg ata ggg ttg gag aag agt gga tgt cga ttt ctt tgg ttg	912
Glu Ile Ala Ile Gly Leu Glu Lys Ser Gly Cys Arg Phe Leu Trp Leu	
290 295 300	

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gcc cgc att tca ccg gag atg gac tta aat gcg ctt ctg ccg gag ggt 960
Ala Arg Ile Ser Pro Glu Met Asp Leu Asn Ala Leu Leu Pro Glu Gly
305 310 315 320

ttt cta tcg aga act aaa gga gta ggg ttt gtg aca aac aca tgg gtg 1008
Phe Leu Ser Arg Thr Lys Gly Val Gly Phe Val Thr Asn Thr Trp Val
325 330 335

ccg caa aaa gag gtg ttg agt cat gat gca gtg ggg ggg ttt gtg act 1056
Pro Gln Lys Glu Val Leu Ser His Asp Ala Val Gly Gly Phe Val Thr
340 345 350

cat tgc ggg tgg agt tcg gtt ctt gaa gcg ctg tcg ttc ggt gtc ccg 1104
His Cys Gly Trp Ser Ser Val Leu Glu Ala Leu Ser Phe Gly Val Pro
355 360 365

atg att ggt tgg ccg ttg tac gca gag cag agg atc aat agg gtg ttc 1152
Met Ile Gly Trp Pro Leu Tyr Ala Glu Gln Arg Ile Asn Arg Val Phe
370 375 380

atg gtg gag gaa ata aag gtg gcg ctg cca ttg gat gag gaa gat gga 1200
Met Val Glu Glu Ile Lys Val Ala Leu Pro Leu Asp Glu Glu Asp Gly
385 390 395 400

ttt gtg acg gcg atg gag ttg gag aag cgc gtc agg gag ttg atg gag 1248
Phe Val Thr Ala Met Glu Leu Glu Lys Arg Val Arg Glu Leu Met Glu
405 410 415

tcg gta aag ggg aaa gaa gtg aag cgc cgt gtg gcg gaa ttg aaa atc 1296
Ser Val Lys Gly Lys Glu Val Lys Arg Arg Val Ala Glu Leu Lys Ile
420 425 430

tct aca aag gca gcc gtg agt aaa ggt gga tcg tcc ttg gct tct ttg 1344
Ser Thr Lys Ala Ala Val Ser Lys Gly Gly Ser Ser Leu Ala Ser Leu
435 440 445

gag aag ttc atc aac tcg gtc act cgt taaagtttct tactcaatat 1391
Glu Lys Phe Ile Asn Ser Val Thr Arg
450 455

atggatcatc gggttaacta ccaaatttta t 1422

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<211> 457

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic protein

<400> 2

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20 25 30

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His His Ser Ser Ile Ser Ile Thr Ile Ile Ser Thr Ala Pro Ala Glu
 35 40 45
 Ser Ser Glu Val Ala Lys Ile Ile Asn Asn Pro Ser Ile Thr Tyr Arg
 50 55 60
 Gly Leu Thr Ala Val Ala Leu Pro Glu Asn Leu Thr Ser Asn Ile Asn
 65 70 75 80
 Lys Asn Pro Val Glu Leu Phe Phe Glu Ile Pro Arg Leu Gln Asn Ala
 85 90 95
 Asn Leu Arg Glu Ala Leu Leu Asp Ile Ser Arg Lys Ser Asp Ile Lys
 100 105 110
 Ala Leu Ile Ile Asp Phe Phe Cys Asn Ala Ala Phe Glu Val Ser Thr
 115 120 125
 Ser Met Asn Ile Pro Thr Tyr Phe Asp Val Ser Gly Ala Phe Leu
 130 135 140
 Leu Cys Thr Phe Leu His His Pro Thr Leu His Gln Thr Val Arg Gly
 145 150 155 160
 Asp Ile Ala Asp Leu Asn Asp Ser Val Glu Met Pro Gly Phe Pro Leu
 165 170 175
 Ile His Ser Ser Asp Leu Pro Met Ser Leu Phe Tyr Arg Lys Thr Asn
 180 185 190
 Val Tyr Lys His Phe Leu Asp Thr Ser Leu Asn Met Arg Lys Ser Ser
 195 200 205
 Gly Ile Leu Val Asn Thr Phe Val Ala Leu Glu Phe Arg Ala Lys Glu
 210 215 220
 Ala Leu Ser Asn Gly Leu Tyr Gly Pro Thr Pro Pro Leu Tyr Leu Leu
 225 230 235 240
 Ser His Thr Ile Ala Glu Pro His Asp Thr Lys Val Leu Val Asn Gln
 245 250 255
 His Glu Cys Leu Ser Trp Leu Asp Leu Gln Pro Ser Lys Ser Val Ile
 260 265 270
 Phe Leu Cys Phe Gly Arg Arg Gly Ala Phe Ser Ala Gln Gln Leu Lys
 275 280
 Glu Ile Ala Ile Gly Leu Glu Lys Ser Gly Cys Arg Phe Leu Trp Leu
 290 295 300
 Ala Arg Ile Ser Pro Glu Met Asp Leu Asn Ala Leu Leu Pro Glu Gly
 305 310 315 320
 Phe Leu Ser Arg Thr Lys Gly Val Gly Phe Val Thr Asn Thr Trp Val
 325 330 335

Pro Gln Lys Glu Val Leu Ser His Asp Ala Val Gly Gly Phe Val Thr
 340 345 350
 His Cys Gly Trp Ser Ser Val Leu Glu Ala Leu Ser Phe Gly Val Pro
 355 360 365
 Met Ile Gly Trp Pro Leu Tyr Ala Glu Gln Arg Ile Asn Arg Val Phe
 370 375 380
 Met Val Glu Glu Ile Lys Val Ala Leu Pro Leu Asp Glu Glu Asp Gly
 385 390 395 400
 Phe Val Thr Ala Met Glu Leu Glu Lys Arg Val Arg Glu Leu Met Glu
 405 410 415
 Ser Val Lys Gly Lys Glu Val Lys Arg Arg Val Ala Glu Leu Lys Ile
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 Ser Thr Lys Ala Ala Val Ser Lys Gly Gly Ser Ser Leu Ala Ser Leu
 435 440 445
 Glu Lys Phe Ile Asn Ser Val Thr Arg
 450 455

<210> 3
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 3
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<210> 4
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 4
 acctccaccc caactttcag g 21

<210> 5
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 5
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<210> 6
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 6
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<210> 7
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 7
 tgcctcgaat ggttgagcac g 21

<210> 8
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 8
 ctctcactct cacaccgc 18

<210> 9
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 9
 cacgaatgct tagcatggct c 21

<210> 10
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 10
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<210> 11
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 11
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<210> 12
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 12
 aaccacaga aacccctgtt c 21

<210> 13
 <211> 1446
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide construct

<400> 13
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 gcccttcgctg atccgataaa caaagctcgt gattcgggcc tcgatattgg actaagcatc 180
 ctcaaatccc caccagaagg atcaggaata ccagatcaca tggtgagcct tgatcatgtt 240
 actgaagatt ggctcccaaa gtttggtgag tcattagtct tattacaaga gccagttgag 300
 aagcttatcg aagaactaaa gctcgactgt ctcgttccg acatgttctt gcccttgaca 360
 gtcgattgtg cggctaagtt cggtattccg aggttgggtt tccacggaac gagcaacttt 420

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gcgttggtgtg cttcggagca aatgaagcctt cacaagcctt ataagaatgt aactctctgat 480
actgagacat ttgttatacc ggatttcccgc catgagctga agtttggtag gactcaagtg 540
gctccggttcc agtctgcgga aacggagaat ggattctcaa agtttgtagaa acagatgacg 600
gagtcctgttg gtagaagcta cgggtgtgtg gttaacagtt ttatgagct cgagctgact 660
tatgtggatt attacagaga ggttttgggt agaagctctt ggaatatagg gcctctgttg 720
ttatccaaca atggcaatga ggaaaaaagta caaaggggaa aggaattctgc ttgtggcgaa 780
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gcgaagtatt ataaggaat ggcgaggcgg gcggttgagg aaggcggttc gtcttataat 1380
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<210> 14

<211> 1488

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 14

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acgatcatcg taacacctct taacgcgcga cgattcaatt ccgttattaa acgagccgtt 180
gaatcaggag agtccattcg tcttctccaa gtaaaattcc ctggtgaaga tccggtgttg 240
ccacctggat gcgaaagcgc cgagacttta ccatcttatg aattgattcc aaattttttt 300
accgcgttaa aaatgttaca acaaccaatc gaggaagaat tgagaaattg gatcccttta 360
ccaagctgcg tcatttgtga taaacacata cctcggactg ctcaaacgtg caagaatctc 420
cgaattccga ggataatttt cgatggaatg agctgttttg ctccatttag aacacacggt 480
ctctacgtgt ctaaggttca tgaaccggtt cctccaaacg agcgttctgt tgttccctga 540
ttcccgatg agatagagtt aacgaggttt caattgccag ggttgttgaa tccaaagcca 600
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gtggtgggtg acagttttga ggagctggaa agactgtatt ctgagatgtt tcggaattg 720
aaagggggta aagtttgttg tgttgggctt ttgtcgcttt atggtaacga cgatttggac 780
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ctgtgtgaaa tggcttaagc ggcagtcгаа gttgggggat ctcatgttaa gaatgtcgac 1440
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<210> 15
 <211> 1446
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide construct

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 cacataagct tcgtcaaacac cgagtagatc cgtctccgcc tccctcaagtc ctgtggccctt 180
 gccgcctctg acggggtacc ggaactttcg ttcatgacta tccccgatgg cctccctttg 240
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 gaacctttt gtgaggtgct atcggaacct atggataatg gttccaaccc gccggtgagc 360
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 ccagaggtgc tgttctggac gcccgctgct tgtggcatct tagctttcac gcagatataag 480
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 atcaagggaa agaaaaatga aaagaaagct atggagtggg agaggaaagc agaagaggcg 1380
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 ccataa 1446

<210> 16
 <211> 1458
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide construct

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 gttcaccttg aattttatcca ccaaatgttg tctaaagccc ataacgccac taaaactgaa 180
 gcagatttat ttctgggaagc acgagaatcc ggtctcgaca tacgttacac aacgattgac 240
 gatggtttcc ctttgggaatt cgacaggggc ctccactccg aggagtattg gcactccatg 300
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 aaacataatc ttgtgaatat ttogttttgg actgaaccag cctgggtggt tctcttggct 480
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 gaataaaatt acgtaccagg agttgattca ataagtacaa gggatttatt gctctatttt 600
 aaagaaccag gatcagaaac attagagaaa aatgttgtgc tcaaggcatt tgaaggagtg 660

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aagaaagctg atttcattctt gcataacaca ttgcaagaac tagaatctga gacactctca 720
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tctgagaag ttaagggctt gttgaagaat gcactggaag ttggtgggtt atcagagaag 1380
aatttcaata aatttattga ggatttgaag gcaaaaattc aaataatgaa agagcaaatg 1440
cctgctaata ccagttga                                     1458

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<210> 17

<211> 1443

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 17

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atcaacttttg tacaacagga gtacaaccac cgccgcctca tcaagtcccg cggcccccacc 180
gccctcgacg gattgcccga tttccgggtc gttacgatcc ccgacgggct tccctttctct 240
gaagccgacg ccacacagga tatcccttct ctttgtgttt caaccaccaa cacttgcttg 300
gagcctcttt gcgagctgct gtcaaacctc gcccggagct gcccccggtg 360
agctcgatcg tatccgatgg tgcgatgagc ttacggttga aggcggcgga gagatttggt 420
ctgcccgaag tgcgtttctg gacgacgagt gcgtgtgggt tcttggcgta taccgatgat 480
aagcatctcg tggagaaagg ctatgtacc ctcaaagata tgagccaaat aacggatgga 540
tatttgaaaa caagcatgga ctggattcca ggaacgaagg acatccaact aagggacttc 600
ccctctttca tcaggacaac agatccagaa gacatcatgc ttaatttttt aatacaagaa 660
actgatgttg ttccgagagc caaagctgta ataacaaca ccttcgacat gttagaacac 720
gacgtcctgg aagcgtctc caccatgttt tcacgcgttt acagcatcgg cccctcttcag 780
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gctgagcagc aaacaaattg taggttcagt tgcgtggaat gggaaatagg aatggagatt 1260
gataataatg tgaagagaga tgaggttgaa gttttgttga ggaatttgag ggatggagag 1320
agggggaaga aaatgaagga gaaagctatg gattggaaag ggaagcatt agaggcaact 1380
gcacttgggg gctcttctta cttgaacttg gaaaaactaa ttaaggaggt gcttttgcat 1440
taa                                     1443

```

<210> 18

<211> 1407

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 18

```

atggcatctt cteccataaa ccagccaacc acgccccgcc acgtgggtggc cctaccctac 60
cccgccgcgc gccacataaa ccccatgctc aacatctgca aagccgtagc ggagaagagc 120
agccacatca accataacaat catcctaacc gaggaatggc tcggcttaat cggctcagcc 180
gacaagccgc cgaacataag ctacgcgcgc ataccgaaca ttctgcgcgc ggagcaccgt 240
cgccgcgcgc atccacatgg tttttgggcg gctgtttggc agaagatgga ggagccggtt 300
gatcggctgc tggacgagct tcggcttaat aataacaagc cggagtttgt gatagccgat 360
gctttcttgc attgggcgcg tgacgtggcg ggcaggagga atattccctt ggcattctgt 420
tggccaatgt cggcgctccac gtccacgggt ctttaccact ttgaccttct cgttgaccac 480
ggacactttc cgatcgacat accagtgaaat ggagatgcta ttgtggatta catcccgga 540
ctccctccag ttccgcgtgc agattttcca aaagacataa gaaaacaaga agacgacacc 600
ttcgtcctta aactcattcc caactcacca aaattcatca tcttcacttc aatttacgac 660
ctcgaatcca agatcatcga cgtctctaaag caaaaatctt ccttctcaat ctacaacatt 720
ggctcctcatg cttcttattc caaactcaaa cacatcctca actcggaata aatcacgaaa 780
cctgatacag ataaccctga ctacttaaaa tgggttagatc tccaaacctcc caactccgct 840
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aaagaggcgt tgatggccgg ggtgccggtt ttgactatcc caattatgtt tgatcaagt 1140
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aatgaagaag agttgggtgg aggaagatgag attgcgaata ttgtgaggag gtttatggat 1260
atcgaaatat gtggagagaa agagttgagc aaaaatgtga aagaggttgc gaagatttgt 1320
gcgagagagt tcgaagatgg agatggacag tcgtttgagt ttaattgtga aagtttgggt 1380
caattgattc tgcaattggg tccgttaa 1407

```

<210> 19

<211> 1428

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 19

```

atgaacaaca caacccaaca acaaacagta gcattagcac tagcacctca ctgtttaatc 60
gtcccattcc cattccaagg ccacatlaac ccttactccc aattcgccaa acgacctata 120
actcaaccaca acaaaaacct ccaaatcaca ttcgcactca ccaaatctat cctcaccaac 180
ctctcctccg gtgcgcgaga atcattcttc tctctccggt caatctccga cggcttcgac 240
gcgcgcggcc gcgctcaggc caactccggc gccgaatacc tctccaatt ccgcgagatc 300
ggatctcaaa cctcaaccga acttatccaa gacctatccc aatcgggtcg acccggtgac 360
tgcggtggtc acgaccggct cgtaccttgg gccttagatg ttgccaaagg taaattcgga 420
atttcaacgg cgcgcttttt tacgcagctc tgtgcggtgg ataataata cagtcgggtt 480
tataacgcgc atttggagct gcggttgcg gagaatgagg tggttagggt tccgggtttg 540
ccggagatgg agccggttga gatcccgagc tttgtgatt taaacgggtc gtaccctgcg 600
agttttgaga tggttgtggg tcagtttagg aatgttgatg aggcggattg gttttttgt 660
aacacttttt atgagttgga gaaagaggtc attgactgga tgcctaaatc ttggcgagtg 720
aaagaacttg tagctaccat accatcaatg ttcatggaca agagattgca agaggacaaa 780
tcatacggct ttacgatggt caagcataca ccttagatg ttgccaaagg gctcaacgga 840
aaacaattca aatccgctcat ttatgtcgca ttggaagtc ttgcagaatt atccacgac 900
caaaactcaa aactggcaca cgctttaaca aattttgcta acgaaacatc taagaaaggg 960
cgatcatcgg aagaagctaa gcttccccaa 1020

```

```

ttgatagtgt cgtggtgccc tcaattagag gtcttgtcgc acgaggccat cggttggttc 1080
gtgactcatt gtggttgtaa ttcaacgctc gagggattga gtttgggggt gcctatggtg 1140
gcgatgccac agtggacgga tcagagtacg aacgctaagt ttatcgtgga tgtttggggg 1200
tggggtgttc gggctaagggt ggacgagggg ggattagcga ggcaagatga gatagttcgt 1260
tgcttaggga gcgtcatgga aggggagaac ggagaaaaga taagaaaaga tcgcaatgaa 1320
tggaaggaa cggcggtgcaa tgcagtgtat gaagggggga gttcagacaa aaatatgaa 1380
gaatttgtta ctacgttgat aagttcccat gacttgcgtc aagagtaa 1428

```

<210> 20

<211> 1425

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<220>

<221> modified_base

<222> (1359)

<223> a, t, c, g, unknown or other

<400> 20

```

atgtctagt agagccaaat aaacttagtg ttcattccct tccctgtaaa gggacacatt 60
gtctcaacgc tagagacggc aaagctaact gtctgatcga acaaacgcct caccatcaca 120
atccctctca tgaagctgcc agtcgacgcc aaggtagatg attccttcac aaaaaatccc 180
tccctgtctc aaataacttt tgtacatctc cctcgaaatcg agcacagttc catggaacca 240
ccgggaactc ccgaatcctt tgtacacagg ttcgtcgaga gccaaaaatg tctcgtaaaga 300
gatgcggtgg ttaaagcaac ggagggtcta aaatcaaaca ggctagccgg atttgtaatc 360
gacatgttct gcaccccgat gatgtatgtg gccaatgaat ttggcgctcc gacatacgtg 420
gctttcacgt ccggggccgc aactctcggt ctattgttcc atttgcagag tcttagagat 480
gaatttaatc agggacgtga ggagatcgag aactcggaag ttgagatatc gatcccggct 540
tatgttaaacc cgttcccttc caaatcctt ccttcaacga ggaagggtgt 600
tttcttagtc ttgcaaaagg gtccagagag gctaaaagta tattgatcaa cactttttta 660
gaatttgaat cccatgccat taaatcgctc tccaacgatg cgagaatccc gctctgttac 720
cccatcgggc cagtaattca gcaccaggaa gataatgcaa acaaaagaaa gcaggacgaa 780
atcatcgctg ggcttgacga gcaacctgat tcatccgtcg tgtttctttg ctccggaagc 840
gctggatgct ttgaagaaaa tcaagtgaag gagattgcag tggcgctcga caaaagtggg 900
taccggtttt tatggtcatt gagaaaagccg cctcccaaa gaaaaagcgg gtttcagggt 960
gagtacaaag atttttaatga agttttacca gaagggttct tacaacgtac gtccgggaga 1020
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ttcgtgtcgc attcggtgtg gaactcgacg ttggagagtg tttggtgcgg agtgccaatg 1140
gccgtgtggc cattggcggc cgagcaacat gcgaacgcgt tccagtttgt gaaggagtgt 1200
ggaattgcgg ttgagattaa gatggattat aggaagaaca gtggtgtgat tgtggaggca 1260
aaaaatgat agaaaaggaat caggaggttg atggaccgg aaaaatgagat aaggggtaat 1320
gtgaaagtga tgaaaaagga gagtaggana gctgtcgtgg atggtggggac ttcttttgat 1380
tacttgatc gttttgttga aactgctgtg aataatgttt tgtga 1425

```

<210> 21

<211> 1446

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

```

<400> 21
atggggttcg tagccggaata cagttacaaa cggcctcatg ctgtgtgcat acccttcccg 60
gcgcaggggc acatcaaccc catgctgaag ttggccaaac tcctccacca aaagggtctc 120
cacatcacat tcgtcaaac agagtacaac caccgccgct tgctcaagtc cctcggtccc 180
gacgctctcg atggcttggc ggatttccga ttgcgaacca tccccgcagg tcttctctcg 240
cttgacggcg acgtcaactca ggaatttctc tctctttgta tgtccaccac taacacttgc 300
ttggaagccct ttaccgagtt gctgttgaaa ctcaataact ccggcccgga cgtgccaccg 360
gtgacctgca tcgtctcgga ttgtgtcatg agcttcacat tgaaggcgccg ggagagggtt 420
gcgctgcgca aagtgtctgt ctggacgacg agtgcgtgtg tttctttggc gtacacgag 480
tataagcgct tcttggagaa aggcctatgt cctctcaaa atattgagcca gtaacaaat 540
agctatctgg aaacaaacct cgactgggtt ccaggaatga aggatattccg attaagggac 600
ttccccatct tcatcaggac aacggatcca aaagacatca tgtacaattt cgtattacaa 660
gaaacccgag ctgtctccag agccaaagct ctgatcatca acacctttca tacattggaa 720
cacgacgttg taaatgccct ctccaccatg ttccacgtg ttacacact cggctctctt 780
cagctgatgt tggaccaggt tcatgacaag agccttaacg ccatcaactc caatctctcg 840
aaagaagaat cgcaatgcac cgattgggtc aattcaaaag agcccgaaat cggtgtgtat 900
gtgaatttgc gtatgtgtac ttgtgtgact gctcaacaac tgacggaatt tgctgtgggg 960
cttgcgaaca gcaacaagac ttctttatgg gttattaggc ctgatatagt tgttgagac 1020
ctcgcaatgc tgccccctga attcttgacg gacacgggaag acagaagcat gctaataagc 1080
tggtgttaac aagaacaggt gttgagggac ccttccatcc gaggattttt gaacacagat 1140
gggttggaat cgacgcttga aagtattgtc agcggagatgc ctatgatgat ttggcctttc 1200
tttctgagc aacagacaaa ttgtagggtc agttgcgtgg aatgggaaat aggaatggag 1260
attgacaata atgtgaagag agatgaggtt gagggtgctgg tgagagagtt gatggatggt 1320
gaaaaggggg agaaaattga gaagaagct atggagtga agatgaaagc gaagacagca 1380
gctgccccct ggggacctc gtctttaa attgaaaaa ttattgagga ggtgcttttt 1440
caataa

```

<210> 22

<211> 1308

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 22

```

atgaaggctc atgcagtgat gcttctcttc cccgtacaag ggcacttaaa tcctatgctg 60
aaactggcca aaattattgca ttcaagaggc ttcttcatca cattcgtagaa cacggaattc 120
aatcacaaat gctctagtgc tgcgagaggc ccgaatcttg ttaaaggctc cgatgatttt 180
cagttcaaaa ccataactgta tggactaccg ccttttgata aggacgcaac cgaagacata 240
cctcaactgt gtgattctct tcaaaagaat ggtcttcttc cattgttggg cctcaltaaa 300
agtattaatg attcaccgga ctgtccaaat gttacctgta tagtgattga ttgtggcatg 360
agtttcgctc ttgatgcggc cgagggtgtt aaaaattcca cgggtacttt gtgcccaact 420
agtgcttggt gattcatggg gttttgcaat tatgaagagc ttgtgaatcg aggatgtttt 480
ccacttaaa atgaagaatca aataactaat ggctatcttg ataccaactc agactgggtg 540
ccagggtatga agaaccattg gctcagagat ttctctagtt tcatccgaac gactgatcca 600
gatgatataca tgggtgaact catgattttt aacatgaaga atgcccctcg tgcaagggtc 660
gtgggtatgca acacatttga tgaattggag aaagatgtat tggaggccct aagtaaaaaa 720
tttgatcatg ttttttccat agggccactc caattgatgg aagggtgttt ccaaaagcct 780
gaggttaaaa ctataggatc aagcttgtgg aaagaagaca acacgtgcat cgctcggtctc 840
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cctcaacaac taltggagtt cgcaltgggg ctacgcaata ctacgcaata ctttttggg 960
atcataaggc cagatttggg aagtgagaaa tctgcgattt tatccgaaga gtaactcaaa 1020
gaagttgaag ggcggggcat gatgtgctgc ttgtgtcttc aagagcaagt attggcccat 1080
ccttcggtag gtggattctt gacacattct ggttggaact cgactatcga aggaatgtca 1140

```

```

gaagggtgttc ctatgatttg ttggcctttt ttgtctgacc aacagaccaa ttgtcggtat 1200
gcatgcacgg agtggggagat tggaaatggag attgaaggag aggttacgag ggataaagtg 1260
gcggattttg tgaataatatt gatggaggag ggaaggggag agcgatga 1308

```

```

<210> 23
<211> 1506
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence: Synthetic
nucleotide construct

```

```

<400> 23
atggccattc atgaacaaaa acctcacttt gtctgtgtcc ctttcatggc acaaggccat 60
atgattccca tggtagatat cgccagatta ctgcggaagc gcggtgtcac aatcaccatt 120
ctactcacac cccacaatgc caacagggtc aaaaacagtc ttgctcgtgc aatcgattca 180
ggactaaata tcaatgtcat ccacttcaaa ttccatcgg ttgaggtcgg attgcccgaa 240
ggttgtgaga atttcgatat gctccctgac atcaatggcg cattcgagtt ttccaaagcc 300
accttcatgt tacaagaaca ggtcgaagag ttgcttccaa agctcgagcc ttctccgagc 360
tgccataatt ctgatatgtg ctttccatgg acaacaaatc ttgctttgaa gttaaatgtt 420
ccaagaattg tgtttcacgg gacaagttgc ttttctctcc tatgtatgca cgtttttaga 480
accttctaag atttcgaagg tgtgactaac gaaacggagt acctccttgt gctctggatta 540
ccagataaaa tcgaataaac caaaattcag cttaggggca cccttattca aatgaattca 600
gactggacga agtttctgta tgaggtgcga gaggctgagg taaaagcatt tggaaacggt 660
gcacaatact ttgaagattt ggaaccagag tatgtcaaa gatacagcag agttaaaagg 720
aaaaaagttc ggtgcatagg tctgttttca ttatgcaaca aagatggcat agacaaggcc 780
gaaagaggta acatggcttc aatcgacgca caccattgct tgaagtggct caattcacac 840
gaacaaaagt ctgttattta cgtctgcctt ggaagcatal ctgcctcgc tacttccaa 900
ctgatagacc ttggattggc tttagaagca tcaaacagac cttttatttg ggtagttaga 960
gatccatcac aagaacttaa aaaaatggtt ttgaatgaga aatttgagga aaggggttaa 1020
gatagaggcc ttttgatcaa cggttggggc cctcaagtgc tcatacttcc ccatccattc 1080
gttggagggt ttgtaacgca ctgcggctgg aactcgatgc ttgaaggggt tacttcaggc 1140
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cacgtgtgac agactgggat aagagtgggt gttgaagtgc ctatcatctt tggagatgaa 1260
gaaaaagtcg gatttttggt gaagaatgat gagataaaga tggttataga taagtgtgat 1320
gatggaggag aagagggaga agagagaaga gagagagctc aaaagcttgg agaaatggca 1380
aaaaaggcaa tggaggaggg tggttcttct tatcataatt tgaatcggt catgcaagat 1440
gtcatgatgc aacaagctaa taatggagat caatatgaag atggtgtttac agttataaat 1500
acatga 1506

```

```

<210> 24
<211> 30
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence: Synthetic
primer

```

```

<400> 24
gggggatcca tggctagtga gagccaaata

```

<210> 25
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 25
 cccctcgagg gtacctcaca aaacattatt caccagc 36

<210> 26
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 26
 atggggagaag aatacaagaa aaca 24

<210> 27
 <211> 26
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 27
 taaaatttgg tagttaaacc gatgta 26

<210> 28
 <211> 1386
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 nucleotide construct

<400> 28
 atgctgagcc tcgccaaaat tctgcaccaa aagggattcc atatcacttt cggttaacact 60
 gaatttaacc atgaacgcct cctgagaacg agaggcccca attcccttga cgggttgccct 120
 tcgtttcgat tcgagacaat tcccgacggt cttccgccat cagaccocga tgctacacaa 180
 aacgtttgat tattgtttga gtccagcaca tccaaatgct tagctccatt caggggacatt 240
 ctgctaagc taaaccacac cgacgtgccg ccagttactt gcatactatc cgacttaatc 300
 atgagcttca ctcttgaagc tgctcaagag ctcagcatcc ctgatgtcct tttttggacc 360
 gctagcgctt gtggatacct cgcttatgca cactatgcca cgcttattga aaaaggattt 420
 aacaccttca aagatacgag ttgcttgacc aatgggtatt tggataccgt tattgatgat 480
 attcctatgc tggaggagcat acgtctgaga gacattccaa gttttatcag aacaactaat 540

```

ccagatgaca ttttgatgaa ctttgtgttg cgagaacacag agagagctag aaaaggttcc 600
gccgtaatct ttaacacggt cgagtgcctc gaggttgaaag cattaacagt accttcatcc 660
atgttgccctc cagtttacac agttggaccc ctgcatttgg ttgaaaagca tgttggctac 720
aaaggtattgg aggtgcttgg atcaaattta tggaaagaag agccaaaatg tctcgaatgg 780
cttgactccc aaattcccaa ctcatgtggt tacgttaatt ttggaagcat cgctgtcatg 840
acaaactgacc aactgatgga gttttcttgg ggtcttgcta atagcaacat atccttcttg 900
tggattataa gacctgacct tgtctcaggg gaaaacgctg ttcttccacc cgaatttctc 960
gaagccacaa aagaaagagg gtgtttagca aattggtgcc ctcaagagaa agtctctagg 1020
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tgcagtgagg ttccaatgat cagttggcgg ttcttcgccc aacaacagag taactgttgg 1140
ttttgctgca caaaatgggg cataggcata gagctagaca atgatgtcaa aagggtataa 1200
gtggaagacc ttgtgcgcga attgatgtct ggggataaag ggaagagat tatgaaaatg 1260
gctatggagt ggaagaagct ggccgaagag tctgccaga gtctcatctt taagaatcta 1320
gagaagtgta ttcataagat gctttttacca ccactacaag tgtgggatcc taaggattcc 1380
acctaa 1386

```

<210> 29

<211> 1374

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 29

```

atggaggaca ctatcggtct ctacgcttca gcagagcacc ttaactccat gctactactc 60
ggcaaatctca tcaacaaaca ccaccccaaca atctcgtcg ccattatcag caccgcccc 120
aacgccgcgcg ctagtctcgt cgccgacgtg gcggccatat ctatcagca actcaaacg 180
gccactctccc ctctggatct aaccaaaaac ccaatcgagc tcttcttcga aatccccagt 240
ctacataatc ctaacttgct cgaagcgctg gaagaactgt cactaaaac aaagtaagg 300
gcattttgta tagatttct ttgcaatccc gcatttgagg ttctgactag cttgaacata 360
cccacttact tctatgtcag cagcgccgcg ttgggctat gcgggttctt gcatttccg 420
acaaatcgacg aaactgtcga aaaagacatc ggtgaactga acgatatctt ggagatcccg 480
ggttgcccgc cggttttctc ctcggttttt ccgaaaggta ttgtcttctg caagatgaac 540
acttacaagc atttttttaga caecggcgaaa aacatgagga gagcgaaagg gatcggtggt 600
aacgccttcg acgcgatgga gttccgagct aaagaagccc tctgcaacaa tctgtcgcta 660
cccaattcgc caactcccc agttttctta gtcggcccat tggctcgagc aagcacaact 720
acgaaaaccca caaacgaca gcacgaatgc ttgaaatggc tggacgtgca gccagacaga 780
acgcgtgatct tcttatgttt cggtaggagg ggtttgttct ccgcagacca attgaaggaa 840
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agtaagccta actctataaa cactgatccg gacctggagc agtctctgcc cgaggggttt 960
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gcggtgtcgt ttgggggtgcc gatgatcggt tggccgatat acgcggagca gaggatgaat 1140
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ttcgtggcgg cggtgggaatt ggagaagaga gtgaaggagt tgatggattc gaagaatggg 1260
agagcgggta ggcagagagt gaaggagatg aaagtggcgg ctgaggtggc ggttgaaaag 1320
ggtggttctg cagttgtggc gttgcaacgc tttgttgata tgggtggttc ttaa 1374

```

<210> 30

<211> 1362

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 30

```

atggaggcag acaagaagaaa tctcaagatt ttaattgttcc catggttggc tcatggtcat 60
atatattccat ttcttgagct agccaaaaga atcttgaagc gaaaaaactc gcacatatatc 120
ttgtgtacca cagccataaa cttcagttct atcaacaact tcattgaaa atataagttg 180
gagaactcaa tagaagtagt agaactccat atagaacctat cccctgaact tccacctcat 240
taccacatac caaagaattt gccacaagat ctcaattcta ccctattaaa ggccattcag 300
acgtcgcaatt cgagcttctc agacatcatc agaactatga aacctgaact agtgatatat 360
gatgtgttct aaccttgggc tgccaagatt gcttctctac aaggtattcc tgctgtttat 420
ttttctagct ttggaggggc accattatca cttatgcatt atcaccacac gtacggaaaa 480
cccgaaattc ctttccaagc aatagtttgt gaggacatcg aactggaaaag tttgctctct 540
ttgtttgatt tcttgtatgc caacatatct gaagtggatc aagattatct tttgggaat 600
ttcaagcaat cttgtgagct tgttttgtta aagagtagta aagggattga gaggaagatc 660
atcgattatc ttctatcttt gtctcagaaa aaaaattatc ctgttggacc actagtcccc 720
gttgacaata agaccaatga ggagaattcc gagatcatga attgtgttag caagaaaaaa 780
caccattcaa ctgtctacat ttcttctcgt agtgaatact tctgtctcaa agaagagatt 840
gaagagatag caaaagggct tgagctttgt gatgttaact ttatatggat catcagattt 900
ccagttggag tgaccgttaa cttagaagaa acactgcctc aaggtttcct tcaaaagggtg 960
aacgaacggg ggaatgttgt ttccagatgg gcaccacaga gcaacatat agcacatcca 1020
agcacaaggag gctttgtgag tcaactgtgg ttgagttcta tcacagaaag gctatatatt 1080
gggtgtccgg tcatatggat ggcaatgaaa ctgtgatcgc caataaacgc cagaaatgta 1140
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gagatagcga agccgatata gaaggtgatt gttgaggaca gtggagaaag gctcggcgaa 1260
agagctttag aattgacgga gaagatgaaa atggaagagg aaaaatgagat ggatgaagta 1320
actgagcagc tgtgggagct ttgtctgagc aaaaacaggt aa 1362

```

<210> 31

<211> 1437

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 31

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atggaaacctc atatatgttat attcccggtc atgtccaaag gccacacaat cccctctctc 60
caccctctccc accctctccc tagtcgcgga gtacgcgtaa cgaatcttcac cactgcacaa 120
aaccacccttt tcatctgtca acatgtccca aaaacaata atgttaccat catgtgacct 180
ccgttccctgt ataacatccc tggaatttca ccaggaaagg agagcacgga caaactcccg 240
tcgatgtctc tcttctgtcc gttcgtgaac gccgctaaat cgaatcaacc gttctctgaa 300
gatgagcttg agaaaaattc ttccaggggt agtttgtgta tatcggtagg ttcttctcat 360
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tactatgctt tgacaatttt tcgagtcgct atctcaaca agttaatatc attgcacgag 480
tcaccgcacg aggcattcac cttaacctagt ttctcttggg ttaaaactcac tagagatcac 540
ttgcacaacac cacttgatca acgtgaacca aatggtccgc aatttgaatt ttctatggaa 600
gcaacgacagc ctactgtgaa tagctatggt ttcttagtga atagcttcta tgagcttgaa 660
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gcagaaaatta cactagaaca gttacatgaa atctcacgag ggttgaagaa gctcaaatga 900
cactttttgt ggggttttaag gaacaatgga gttgaactaa gtgattgagt tgaagacagg 960
gttaagaata gaggaattgt agtaaaagaa tgggttgatc aaagagagat tcttgaacct 1020
gaaagtgtaa aaggctttct aagtcattgc ggctggaatt cggtaagtga aggtatatgt 1080

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```

gcgagggttc tgattcttgc gtggccaatg atagcggagc aacacttgaa tgcaaaagatg 1140
gtgagtgaag aaataaagat tggtttgaga gttgaaacgg ttgatggaac ggcaaaagga 1200
tttgtgactg cggcgagttt gacgaaggcg gtgatggaat tgatggaggg tgagaaagggg 1260
aaggaaattga gggagaattg gaagaaagtg gcggggggcag cgagggaagc ggtggtgtaa 1320
ggtgggtcgt cgtggaatgg tttgaatgaa ctcatgtgat aggtgtgtag gcataaggaa 1380
atgagtggta gttctaaagt tgatgaaac aagagggaat ttaaggatat taattaa 1437

```

<210> 32

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 32

cccatgggag aagaatacaa gaaa

24

<210> 33

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic primer

<400> 33

ggtacctata aaatttggtg gttaaa

26

<210> 34

<211> 1080

<212> DNA

<213> Homo sapiens

<400> 34

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caccgattac atgacgtaca tgttcaagta cgcagtggt catggtcagt ggaacacca 60
cgagttgaag gtacaggatg agaagaccct tctgtttggt gaaaagccag taagagtctt 120
gtcaactgggt gtcttcacgg acaagataaa ggctgtgct cacttgaagg gtggtgccaa 180
gaagggttggt atctcagcac caagcaaaaga tgaccaatg tttgttgtg gtgtcaatga 240
gaaggaatac aaaccagagt tggacattgt ttccaatgct agttgcacta ccaattgcct 300
tgcccccttg gccaaaggtca ttaatgatag atttggattt gttgagggcc tcatgaccac 360
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tggtaaagtg ctccccagtc tcaatggaaa gctaacggga atggccttcc gtgttcctac 540
tgtcgatgtc tccgtagtgg acctcactgt caggctcgag aaagaggcca cttatgatga 600
gatcaaaagt gctatcaagg aggaatccga gggcaacctt aagggcatct ttggctatac 660
cgaagatgat gtggtgtcaa cagactttgt tggatgatc cgatcaagca ttttcgatgc 720
caaggctgga attgcattga gcaagacgtt tgtgaagcgt gtgtcgtggt acgacaacga 780
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ttttgggtat gttttgctga aacctatttt attacccttt cgcgttgggt tattgaatgt 1020
gaactctttt tactgatgtg tttaacgttc tctcttttaa aaaaaaaaaa aaaaaaaaaa 1080

```

<210> 35
 <211> 20
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 35
 tgttgctggt aacgatccat 20

 <210> 36
 <211> 18
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 36
 agctcttcca cctctcca 18

 <210> 37
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 37
 atgttcaaaa atcctaatat ccgc 24

 <210> 38
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 38
 ttagccatca agctcaatct tgaca 25

 <210> 39
 <211> 16
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 39
 aacagctatg accatg

16

<210> 40
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic primer

<400> 40
 gctttaccat ggagtaatga gctt

24

<210> 41
 <211> 1367
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic nucleotide construct

<400> 41
 gtatgtatgt atgtatgcta tatacagagc gataaagttg atcgttttca ttttcgacaa 60
 atacaaacct cgtgagagaa tcttctcgat catatggcac gagcaggacc actaaccccta 120
 acttcgctag cgctcgagaa atcgtctgcat gaaaagtta taaggagcga agacgagagg 180
 cctaacttag catacagatca atttagcagt cagattccat tgaatctctct cctcgggac 240
 gacgatgaat gtaataagag gaaagagctg tgcaagagaa tagcgaggcc atgcgaagat 300
 tggggatatt ttcaagtgtat cgatcatggg atcgatttga aactcgtcaa cgaatgact 360
 cgtttggctc gtgagtctct cgatttgccc gacgaagaga agctgagggt cgaatgtct 420
 ggtggggagaa aaggaggttt catgttttcg agccaccttc agggcgaggt ggtccaagac 480
 tggcgcgaga tctgacacta cttcacatac cctatcaaa ggcgtgacta ttcctgtgg 540
 cccgacaagc ccgagggcatg gcggggcgtg acagagacct acagctcgca gctaattgtc 600
 ctggggctgca aattgctagg aatcctatcc gaggcaatgg gcctcgaaag agaagcgtg 660
 accaaggcct gtctgaacat ggaccacaaa gttgtggtca acttttacc aaatgcct 720
 cagcccaatt tgacattggg cctgaagagg cactcgacc caggtttgat cactctgct 780
 ttctcaggata acgttggcgg gcttcaagcg actcgagacg gcgggaagtc gtggatcacg 840
 gtccagcccg ttgaggggtc attcgtggtc aatccttggtg attttgtcga ttacttgagc 900
 aatggaaagt tcaagaacgc ggaatcatcga gcggtggtga attcaaacac gaatagaatg 960
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 gacgacggga agccccattat agaaaagccc atcaactatg gagaatgta caagaggaag 1080
 atggcctaaa acattgaact tgccaagctc aagaagctag ccaaggaaca aaagtgcga 1140
 gaagaagtgt ttaataatgt tgaagatcat catcttaaca atgggaaaaa taaataggag 1200
 gtaaggtct ttaaggaaac tgacgttgtc ttgtgattgt tatatatctt ctatgtcgtg 1260
 ttgctcttaa ggttgtcaga tgaanaatgc gaccatgtta ggtattttaa ttatatgaat 1320
 tgtattgcct agtcggccat attatgatta aaaaaaaaa aaaaaa 1367

<210> 42
 <211> 22
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 42
 ttctctgtcg acgcccattg cc 22

 <210> 43
 <211> 22
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 43
 cgccgtgtcg actcgcttga ag 22

 <210> 44
 <211> 24
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 44
 aattatttcc caatgttcaa aaat 24

 <210> 45
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 45
 tggagcttta ggtttgtgaa a 21

 <210> 46
 <211> 23
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 46
 atgggagaag aatacaagaa aac 23

<210> 47
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 47
 tcttacgata aaacaaactc a 21

<210> 48
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 48
 atcatcgagc ggtggtgaa 19

<210> 49
 <211> 21
 <212> DNA
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<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 49
 tggccgacta ggcaatacaa t 21

<210> 50
 <211> 22
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 primer

<400> 50
 cccttctggt tgggtgaaaag cc 22

<210> 51
 <211> 22
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 51
 cctcggattc ctccttgata gc 22

 <210> 52
 <211> 29
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 52
 cccatatata gccatggaag ataccatcg 29

 <210> 53
 <211> 26
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 53
 tagtggttgtagtgcggggg atttcg 26

 <210> 54
 <211> 21
 <212> DNA
 <213> Artificial Sequence

 <220>
 <223> Description of Artificial Sequence: Synthetic
 primer

 <400> 54
 aatgggatgc ttccgacttc t 21

 <210> 55
 <211> 21
 <212> DNA
 <213> Artificial Sequence

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<220>
<223> Description of Artificial Sequence: Synthetic
        primer

<400> 55
cagtgggttc tgccattgct t                                21

<210> 56
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        probe

<400> 56
aggaaaaaac aggctgaaaa                                20

<210> 57
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        primer

<400> 57
catcgagcgg tggatgaatt                                19

<210> 58
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        primer

<400> 58
ctggcgatgg gttttgaaa                                19

<210> 59
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
        probe

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<400> 59
aaacacgaat agaatgtcg 19

<210> 60
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 60
gaagatgacc ttgcggtgat tt 22

<210> 61
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 61
ttgtcctctt cccctttata ggttt 25

<210> 62
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
probe

<400> 62
agttcgcccg gagtttcgtg agtctg 26

<210> 63
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 63
ggttggcccg catttca 17

<210> 64
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 64
tagaaaaaccc tccggcagaa 20

<210> 65
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
probe

<400> 65
agatggactt aaatgcg 17

<210> 66
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 66
gcattgagca agacgtttgt g 21

<210> 67
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 67
acgggaactg taacccatt c 21

<210> 68
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic probe

<400> 68

agcttggtgc gtggtacg

18

<210> 69

<211> 2220

<212> DNA

<213> *Linaria bipartita*

<220>

<221> CDS

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<400> 69

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atatacttgt acaaatctac tgcaactaaa acctattatt aattatatat ataccatata 120

atagat atg gaa gat acc atc gta ttt tac act cca agc gat cac agt 168

Met Glu Asp Thr Ile Val Phe Tyr Thr Pro Ser Asp His Ser

1

5

10

caa ccc aca ata gcg ttg gca aag ttc atc agc aaa cac cac cct tcc 216

Gln Pro Thr Ile Ala Leu Ala Lys Phe Ile Ser Lys His His Pro Ser

15

20

25

30

atc tcc atg aca atc atc agc acc gcc gca ttc cct tcg tcc gca gcg 264

Ile Ser Met Thr Ile Ile Ser Thr Ala Ala Phe Pro Ser Ser Ala Ala

35

40

45

gtg ctg cct aaa aca ata agt tac cac ccc ctc ccc gcc gtg ccc atg 312

Val Leu Pro Lys Thr Ile Ser Tyr His Pro Leu Pro Ala Val Pro Met

50

55

60

ccc ccg aac ctc tcc tcc aat ccc gtg gaa ttc ctc ttc gaa atc ccc 360

Pro Pro Asn Leu Ser Ser Asn Pro Val Glu Phe Leu Phe Glu Ile Pro

65

70

75

cga ctc cac aac act aaa ctc cgc gaa gca ctc gaa aga atc tcc gag 408

Arg Leu His Asn Thr Lys Leu Arg Glu Ala Leu Glu Arg Ile Ser Glu

80

85

90

aca tca aag atc aag gcg ttg gtt atc gat ttc ttt tgc aac tcc gct 456

Thr Ser Lys Ile Lys Ala Leu Val Ile Asp Phe Phe Cys Asn Ser Ala

95

100

105

110

ttc gaa gtt tcc agg agc ttg aac att ccg aca ttc ttc gaa gcc agc 504

Phe Glu Val Ser Arg Ser Leu Asn Ile Pro Thr Phe Phe Glu Ala Ser

115

120

125

ctc gcc gcg tcc ggg ctc tgc gag ttt ctc tac cac ccg aca ttt cac 552

Leu Gly Ala Ser Gly Leu Cys Glu Phe Leu Tyr His Pro Thr Phe His

130

135

140

aaa acc gtc ccc gga gac atc gcg gac ttc aac gac ttt ctt gaa atc Lys Thr Val Pro Gly Asp Ile Ala Asp Phe Asn Asp Phe Leu Glu Ile 145 150 155	600
ccg ggg tgc cct ccg ctt cac tcg gct gat gtc cct aag ggt ttg ttc Pro Gly Cys Pro Pro Leu His Ser Ala Asp Val Pro Lys Gly Leu Phe 160 165 170	648
cga cgc aag act att gct tac aaa cac ttc ctc gac act gcc aac aac Arg Arg Lys Thr Ile Ala Tyr Lys His Phe Leu Asp Thr Ala Asn Asn 175 180 185 190	696
atg cgg atg tcg agt gga atc ctc tta cac gcg ttc gat gcg ctt gaa Met Arg Met Ser Ser Gly Ile Leu Leu His Ala Phe Asp Ala Leu Glu 195 200 205	744
tac cga gct aag gaa gct ttg tcc aac gcc ttg tgc aat ccg gac ggg Tyr Arg Ala Lys Glu Ala Leu Ser Asn Gly Leu Cys Asn Pro Asp Gly 210 215 220	792
cca act ccg cct gtt tac ttt gtt tcg cct act gtg gct gaa aca ttg Pro Thr Pro Pro Val Tyr Phe Val Ser Pro Thr Val Ala Glu Thr Leu 225 230 235	840
gca tac agg gaa aac acc gcc gcc ttg ccg cat gaa tgc ttg acg tgg Ala Tyr Arg Glu Asn Thr Ala Ala Leu Arg His Glu Cys Leu Thr Trp 240 245 250	888
ctt gat ttg cag cct gat aaa agc gtt atc ttc ctt tgt ttt gga agg Leu Asp Leu Gln Pro Asp Lys Ser Val Ile Phe Leu Cys Phe Gly Arg 255 260 265 270	936
agg gga aca ttc tcc atg caa cag ttg cat gaa att gct gtc ggt ctt Arg Gly Thr Phe Ser Met Gln Gln Leu His Glu Ile Ala Val Gly Leu 275 280 285	984
gaa cgg agc ggg cga aga ttt ctc tgg gcc atc cgc agt agt ggg gca Glu Arg Ser Gly Arg Arg Phe Leu Trp Ala Ile Arg Ser Ser Gly Ala 290 295 300	1032
ggg aac ggt gag cct gac ttg agc gtg gtg ctg ccg gag ggt ttc ttg Gly Asn Gly Glu Pro Asp Leu Ser Val Val Leu Pro Gly Phe Leu 305 310 315	1080
gag aga acc aaa gat att ggg ctg gtg ata acg aca tgg gcg ccg cag Glu Arg Thr Lys Asp Ile Gly Leu Val Ile Thr Thr Trp Ala Pro Gln 320 325 330	1128
aaa gag gtg tta agc cat gtg gcc gtg tgt gga ttt gtg acg cac tgc Lys Glu Val Leu Ser His Val Ala Val Cys Gly Phe Val Thr His Cys 335 340 345 350	1176
ggc tgg aac tca gtt ctc gag gcg gtg tcg ttt ggg gtt ccg atg att Gly Trp Asn Ser Val Leu Glu Ala Val Ser Phe Gly Val Pro Met Ile 355 360 365	1224

ggg tgg ccg ctg tac gca gag cag agg atg aat cgg gtg ttt atg gtg 1272
 Gly Trp Pro Leu Tyr Ala Glu Gln Arg Met Asn Arg Val Phe Met Val
 370 375 380

gag gaa ata aag gtg gca ttg cct ttg gag gag gag gcg gat ggg ttg 1320
 Glu Glu Ile Lys Val Ala Leu Pro Leu Glu Glu Glu Ala Asp Gly Leu
 385 390 395

gtg agg gcg aca gaa ttg gag aag cgg gtg aga gag ttg acc gag tcc 1368
 Val Arg Ala Thr Glu Leu Glu Lys Arg Val Arg Glu Leu Thr Glu Ser
 400 405 410

gtg agg gga aaa gcg gta agc cgg cgg gtg gag gaa atg aga ctc tcg 1416
 Val Arg Gly Lys Ala Val Ser Arg Arg Val Glu Glu Met Arg Leu Ser
 415 420 425 430

gca gag aag gcc gtg agc aag ggt gga acg tcg ctg att gca ttg gag 1464
 Ala Glu Lys Ala Val Ser Lys Gly Gly Thr Ser Leu Ile Ala Leu Glu
 435 440 445

aaa ttc atg gac tcg att act cta taagcgtaag agttgctata aatttagcta 1518
 Lys Phe Met Asp Ser Ile Thr Leu
 450

tgttgccagg atacgtcaaa taaaccttgc tcgtattctt agatacgtat actatacaaa 1578

tacaatttat gaataagttt ttcatatggc gtatgaagta ttctaattaa attaaataac 1638

acgttttgaa gcgttattat aagggcgtaa ctagtaaata ataagaaata attaaacaaa 1698

aaaaatttat gatgttaatg ataattttat taatatttta tactataaag ttcttaatat 1758

tcttggtgat atgtaagttt attatataag tattttaagt gttttatttg gtattttgaa 1818

tttaagtacc atcgtggaat acctttatat gagcttataa ttttaagtgt gaatagattt 1878

catattaata tgttattatt tatgtgaaca aaaaatatta ttgctcaagt tattttgaa 1938

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tattttacaa agttaccctt attcgtttca tgtttgatac attttttcat attcgtatat 2058

gtgcccggtt ccgtgcaata tagtaaatga gttatggtat gtgatgtttc tatgttgtaa 2118

caaaataatg gtacttaatt tgaatagtc agtcaagtat ttgtaagtgt aaattaatat 2178

tccattttaa attccattat tctctcaaaa aaaaaaaaaa aa 2220

<210> 70

<211> 454

<212> PRT

<213> *Linaria bipartita*

<400> 70

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Thr Ile Ala Leu Ala Lys Phe Ile Ser Lys His His Pro Ser Ile Ser
 20 25 30
 Met Thr Ile Ile Ser Thr Ala Ala Phe Pro Ser Ser Ala Ala Val Leu
 35 40 45
 Pro Lys Thr Ile Ser Tyr His Pro Leu Pro Ala Val Pro Met Pro Pro
 50 55 60
 Asn Leu Ser Ser Asn Pro Val Glu Phe Leu Phe Glu Ile Pro Arg Leu
 65 70 75 80
 His Asn Thr Lys Leu Arg Glu Ala Leu Glu Arg Ile Ser Glu Thr Ser
 85 90 95
 Lys Ile Lys Ala Leu Val Ile Asp Phe Phe Cys Asn Ser Ala Phe Glu
 100 105 110
 Val Ser Arg Ser Leu Asn Ile Pro Thr Phe Phe Glu Ala Ser Leu Gly
 115 120 125
 Ala Ser Gly Leu Cys Glu Phe Leu Tyr His Pro Thr Phe His Lys Thr
 130 135 140
 Val Pro Gly Asp Ile Ala Asp Phe Asn Asp Phe Leu Glu Ile Pro Gly
 145 150 155 160
 Cys Pro Pro Leu His Ser Ala Asp Val Pro Lys Gly Leu Phe Arg Arg
 165 170 175
 Lys Thr Ile Ala Tyr Lys His Phe Leu Asp Thr Ala Asn Asn Met Arg
 180 185 190
 Met Ser Ser Gly Ile Leu Leu His Ala Phe Asp Ala Leu Glu Tyr Arg
 195 200 205
 Ala Lys Glu Ala Leu Ser Asn Gly Leu Cys Asn Pro Asp Gly Pro Thr
 210 215 220
 Pro Pro Val Tyr Phe Val Ser Pro Thr Val Ala Glu Thr Leu Ala Tyr
 225 230 235 240
 Arg Glu Asn Thr Ala Leu Arg His Glu Cys Leu Thr Trp Leu Asp
 245 250 255
 Leu Gln Pro Asp Lys Ser Val Ile Phe Leu Cys Phe Gly Arg Arg Gly
 260 265 270
 Thr Phe Ser Met Gln Gln Leu His Glu Ile Ala Val Gly Leu Glu Arg
 275 280 285
 Ser Gly Arg Arg Phe Leu Trp Ala Ile Arg Ser Ser Gly Ala Gly Asn
 290 295 300
 Gly Glu Pro Asp Leu Ser Val Val Leu Pro Glu Gly Phe Leu Glu Arg
 305 310 315 320
 Thr Lys Asp Ile Gly Leu Val Ile Thr Thr Trp Ala Pro Gln Lys Glu

	325		330		335
Val Leu Ser His Val Ala Val Cys Gly Phe Val Thr His Cys Gly Trp					
	340		345		350
Asn Ser Val Leu Glu Ala Val Ser Phe Gly Val Pro Met Ile Gly Trp					
	355		360		365
Pro Leu Tyr Ala Glu Gln Arg Met Asn Arg Val Phe Met Val Glu Glu					
	370		375		380
Ile Lys Val Ala Leu Pro Leu Glu Glu Glu Ala Asp Gly Leu Val Arg					
	385		390		395
Ala Thr Glu Leu Glu Lys Arg Val Arg Glu Leu Thr Glu Ser Val Arg					
	405		410		415
Gly Lys Ala Val Ser Arg Arg Val Glu Glu Met Arg Leu Ser Ala Glu					
	420		425		430
Lys Ala Val Ser Lys Gly Gly Thr Ser Leu Ile Ala Leu Glu Lys Phe					
	435		440		445
Met Asp Ser Ile Thr Leu					
	450				